

## ***Curriculum Vitae- Robert Merritt Northington, Ph.D.***

University of Maine, Climate Change Institute and School of Biology and Ecology,  
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### **Education**

- 2013: Ph.D., Biological Sciences      Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg, VA  
**Emphasis:** Ecology, Evolution, and Behavior; Aquatic Ecosystem Ecology  
**Dissertation Title:** Effects of experimentally-altered hydrology on ecosystem function in headwater streams  
**Advisor:** Dr. Jack Webster
- 2011: Graduate Certificate,      Virginia Polytechnic Institute and State University (Virginia  
*Future Professoriate*      Tech), Blacksburg, VA
- 2005: M.S., Biology      University of North Carolina-Greensboro, Greensboro, NC  
**Thesis title:** The effect of site type on the use of terrestrial and aquatic food resources by fish in headwater urban streams  
**Advisor:** Dr. Anne Hershey
- 2003: B.S., Biology      Longwood University, Farmville, VA  
**Major:** Biology, with Secondary Teaching Licensure

### **Research Interests**

Ecosystem ecology; freshwater ecology; aquatic-terrestrial linkages; biogeochemistry; climate change; hillslope and watershed processes; Arctic ecology; restoration ecology; urban ecology

### **Professional and Research Experience**

- 2016- present    Research Assistant Professor, University of Maine Climate Change Institute
- 2014- 2016      Lecturer in Biology (BIO 100; enrollment: ~800 students), Course Coordinator for BIO 222/223 (Biology: The Living Science Lecture and Laboratories; enrollment: ~160 students), University of Maine School of Biology and Ecology
- 2013- 2016      Post-doctoral Research Associate, University of Maine Climate Change Institute, Supervisor: Dr. Jasmine Saros, Arctic system ecology, Limnology  
*\*Tasks: Planning and executing field studies of lakes in remote regions of Greenland; mentoring undergraduate and graduate students; collecting and processing environmental water samples for nutrients and ions; contributing to and writing peer-reviewed publications and funding proposals for national and regional grants*
- 2009-2013      Graduate Teaching Assistant, Virginia Polytechnic Institute and State University, Department of Biological Sciences
- 2008- 2009,    Graduate Research Assistant, Virginia Polytechnic Institute and State University,  
2011      Department of Biological Sciences
- 2006-2008      Research Technician II, University of North Carolina at Greensboro, Department of

- 2000-2006 Research Technician II, University of North Carolina at Greensboro, Department of Biology. Supervisor: Dr. Anne Hershey, Arctic aquatic ecology  
*\*Tasks: Planned and executed field studies of lakes, streams, and rivers in remote regions of Arctic Alaska; mentored undergraduate and graduate students; collected and processed environmental water samples for stable isotopes, nutrients, and greenhouse gases; contributed to and wrote peer-reviewed publications*
- 2004-2005 Graduate Research Assistant, University of North Carolina at Greensboro, Department of Biology
- 2003-2005 Graduate Teaching Assistant, University of North Carolina at Greensboro, Department of Biology
- 2002 Research Technician, Virginia Tech Southside Piedmont Agricultural and Research Extension Center, Blackstone, VA. Supervisor: Dr. Charles Johnson, Plant Pathology
- 2001 NSF-Research Experience for Undergraduates (REU) Fellow, Great Lakes WATER Institute, Milwaukee, WI. Supervisors: Drs. Russell Cuhel and Michael Carvan, III, Aquatic Toxicology
- 2000-2002 Undergraduate Research Technician, Longwood University, Department of Natural Sciences  
 Supervisor: Dr. Timothy Stewart, Aquatic Ecology

### **Peer-Reviewed Publications**

15. **Northington, R.M.**, J.E. Bullard, and J. Telling. 2016. The role of the Greenland Ice Sheet in modulating the effects of climate change in the ice-free regions of Greenland. *In Press, EOS*.
14. **Northington, R.M.**, and J.E. Saros. 2016. Factors controlling methane concentrations in Arctic lakes of southwestern Greenland. *PLOS One*, doi: 10.1371/journal.pone.0159642
13. Hershey, A.E., **R.M. Northington**, J.C. Finlay, and B.J. Peterson. 2016. Stable isotopes in food web ecology. In Hauer, R., and G.A. Lamberti (eds.), *Methods in Stream Ecology, 3<sup>rd</sup> Edition*. *In Press*.  
*\*\* This text is the preeminent source of methodology for studying streams across multiple scales of ecology.*
12. Saros, J.E., **R.M. Northington**, C.L. Osburn, B.T. Burpee, and N.J. Anderson. 2016. Water transparency and epilimnetic temperatures affect thermal stratification patterns across small Arctic lakes of southwest Greenland. *Limnology and Oceanography*, doi: 10.1002/lno.10314
11. Burpee, B.T., J.E. Saros, **R.M. Northington**, and K.S. Simon. 2016. Microbial nutrient limitation in Arctic lakes in a permafrost landscape of southwest Greenland. *Biogeosciences* 13: 1-10, doi:10.5194/bg-13-1-2016
10. Saros, J.E., C.L. Osburn, C.A. Stedmon, **R.M. Northington**, S. Birkel, J. Auger, and N.J. Anderson. 2015. Recent decrease in DOC concentrations in Arctic lakes of southwest Greenland. *Geophysical Research Letters* 42: 6703-6709, doi: 10.1002/2015GL065075
9. Hershey, A.E., S.C. Whalen, J. Hart-Smith, M.C. Bostick, and **R.M. Northington**. 2015. Methane efflux and oxidation, and use of methane-derived carbon, in arctic lake sediments. *Limnology and Oceanography* 60: 276-285.
8. Currinder B., K. K. Cecala, **R.M. Northington**, and M.E. Dorcas. 2014. Response of stream salamanders to experimental drought in the southern Appalachian Mountains, USA. *Journal of Freshwater Ecology*, doi: 10.1080/02705060.2014.938135  
*\*This article was led by an undergraduate researcher.*
7. Hershey A.E., **R.M. Northington**, and S.C. Whalen. 2014. Methane processing in a small arctic lake: temporal variation in production, methanogenesis pathways, and methane oxidation. *Biogeochemistry*, 117: 225-226

6. **Northington R.M.**, J.R. Webster, E.F. Benfield, B.M. Cheever, and B.R. Niederlehner. 2013. Ecosystem function in headwater streams during active infestation by hemlock woolly adelgid. *PLOS ONE* 8: 1-8, doi: 10.1371/journal.pone.0061171.t001
5. **Northington, R.M.**, J.R. Webster, E.F. Benfield, S.H. Shoenholtz, A.J. Timpano, and C. Zipper. 2011. An assessment of structural attributes and ecosystem function in restored Virginia coalfield streams. *Hydrobiologia* 671: 51-63.
4. Hershey, A.E., E. Binkley, K. Fortino, M.D. Keyse, C. Medvedeff, and **R.M. Northington**. 2010. Utilization of carbon sources of allochthonous and autochthonous origins by *Chironomus* in arctic lakes. *Verh. Internat. Verein. Limnol.* 30: 1321-1325.
3. **Northington, R.M.**, M.D. Keyse, S.R. Beaty, S.C. Whalen, E.R. Sokol, and A.E. Hershey. 2010. Benthic secondary production in eight oligotrophic arctic Alaskan lakes. *Journal of the North American Benthological Society* 29: 465-479.
2. Hershey, A.E., G.A. Lamberti, D.T. Chaloner, and **R.M. Northington**. 2010. Aquatic insect ecology. Pages 659-694 in Thorp, J.H. and A.P. Covich (eds.), *Ecology and Classification of North American Freshwater Invertebrates*. 3rd edition, Elsevier Press.
1. **Northington, R.M.**, and A.E. Hershey. 2006. Effects of stream restoration and wastewater treatment plant effluent on fish communities in urban streams. *Freshwater Biology* 51: 1959-1973.

### **Manuscripts in Review**

1. Anderson, N.J., J.E. Saros, J.E. Bullard, S.M.P. Cahoon, S. McGowan, E.A. Bagshaw, C. Barry, R. Bindler, B.T. Burpee, R.A. Fowler, M. Giles, L. Hamerlik, A. Law, S.H. Mernild, **R.M. Northington**, C.L. Osburn, S. Pla-Rabes, E. Post, J. Telling, E. Whiteford, M. Yallop, and J.C. Yde. The Arctic in the 21<sup>st</sup> century: Changing biogeochemical linkages across a glacial landscape of Greenland. *In Review, BioScience*.
2. Saros, J.E., **R.M. Northington**, D. Anderson, and N.J. Anderson. A whole-lake experiment confirms a small centric diatom species as an indicator of changing lake thermal structure. *In Review, Limnology and Oceanography Letters*.
3. Pelletreau, K.N., T. Andrews, N. Armstrong, M. Bedell, F. Dastoor, N. Dean, S. Erster, C. Hartley, N. Guild, J.K. Knight, D. Koslowski, P.P. Lemons, J. Martin, J. McCourt, J. Merrill, R. Moscarella, R. Nehm, **R.M. Northington**, B. Olsen, L. Prevost, J. Stoltzfus, M.U. Lurain, and M.K. Smith. Using a clicker-based case study to untangle student thinking about the stages of the central dogma. *In Review, CourseSource*.  
 \* *This manuscript describes a plan for teaching inquiry-based lessons for seminal content in introductory biology courses. I have participated in the implementation of this lesson in multiple undergraduate biology courses as a lecturer at U.Maine.*

### **Manuscripts in Preparation**

1. **Northington, R.M.**, and J.R. Webster. Experimental reductions in hydrologic connectivity alter litter processing and consumer subsidies in headwater streams. *In Prep*.
2. **Northington, R.M.**, and J.E. Saros. Structural and functional responses of an arctic lake to experimental water column temperature manipulation. *In Prep*.
3. Malik, H., **R.M. Northington**, and J.E. Saros. Response of different *Cyclotella* species to light in a P-limited and N+P co-limited lakes in the Arctic. *In Prep*.
4. **Northington, R.M.**, and J.E. Saros. Factors affecting lake surface water temperatures across southwest Greenland. *In Prep*.

## **Research Reports**

1. **Northington, R.M.**, J.R. Webster, E.F. Benfield, S.H. Shoenholtz, A.J. Timpano, D. Evans, and C. Zipper. 2009. A preliminary assessment of ecosystem function in Virginia coalfield streams. Powell River Project Research and Education Program Reports.  
[http://www.cses.vt.edu/PRP/Reports\\_09/Reports\\_09.html](http://www.cses.vt.edu/PRP/Reports_09/Reports_09.html).

## **Awards, Grants, and Professional Honors**

2016 Maine Water Resources Research Institute (WRRI), FY2017 Water Resources Sustainability Research Grant: "Investigating the role of watersheds in regulating nutrient and carbon loading into Maine's drinking water lakes." Lead PI: **R.M. Northington**, Co-PIs: D. Hayes, S. Jain, J.E. Saros. \$62,483. *Pending*.

Association for the Sciences of Limnology and Oceanography (ASLO) Early Career Travel Grant, \$500

2012 Coweeta Long-term Ecological Research (LTER) Travel Grant, \$950

2011 Best Poster Award (Basic Research), North American Benthological Society (now Society for Freshwater Science) Annual Meeting, Providence, RI

Virginia Tech "2010" Graduate Fellowship, \$5,048

Dr. John G. Palmer Memorial Graduate Studies Endowed Scholarship, \$1,500

2010 Virginia Tech Graduate Research Development Program (GRDP) Grant, "The effect of flow reduction on organic matter decomposition in stream ecosystems" \$482

Virginia Tech Graduate School Travel Fund Program (TFP) Grant, \$200

2005 Biology Department Graduate Student Research Grant, The University of North Carolina-Greensboro, \$500

2004 Biology Department Graduate Student Research Grant, The University of North Carolina-Greensboro, \$500

2002 Wayne H. Tinnell Scholarship- Longwood University

Edith Stevens Scholarship- Longwood University

2001 Virginia Academy of Sciences Undergraduate Research Grant, \$500

2000 Honors Program Undergraduate Research Grant, Longwood University, \$500

1999 Hull Scholars Excellence in Education Scholarship, Longwood University (tuition + fees, renewable annually)

## **Invited Seminars**

2015 "Greenland ecosystems as sentinels for enhanced climate change in the Arctic." University of North Carolina-Greensboro Biology Seminar Series.

"Patterns in lake-water methane across southwestern Greenland." University of Maine, Freshwater Ecology Research Group Seminar Series.

2014 "Linkages across ecosystems: contemporary changes and implications for the future." University

of Maine, School of Biology and Ecology Seminar Series. Orono, ME.

- 2013 “Hydrologic control of detrital breakdown in headwater stream ecosystems.” Virginia Tech Biological Sciences Research Day, Blacksburg, VA.
- 2012 “Hydrologic controls on ecosystem processes in perennial Appalachian streams.” Long-term Ecological Research (LTER) All-Scientists Meeting, Estes Park, CO.

**Professional Research Presentations (presenter = \*)**

- 2016 **R.M. Northington**, J. McCue, and J.E. Saros. Experimental manipulation of lake mixing depth alters phytoplankton communities and biomass in an Arctic lake in Southwest Greenland. 2016 ASLO Annual Meeting, Santa Fe, NM (Oral).

H.S. Greig\*, K.A. Capps, J. Gill, **R.M. Northington**, T. Parr, and A. Klemmer. Experimental evidence that hemlock decline changes the role of detrital subsidies in freshwater food webs. Society for Freshwater Science Annual Meeting, Sacramento, CA (Oral).

J.E. Saros\* and **R.M. Northington**. Quantifying the role of lakes in the arctic carbon cycle. Harold W. Borns Symposium, University of Maine Climate Change Institute, Orono, ME (Oral).

- 2015 **R.M. Northington\*** and J.E. Saros. Methane and sulfate in lakes of southwestern Greenland. Kangerlussuaq-A Research Synthesis. Shrewsbury, United Kingdom.

**R.M. Northington\*** and J.E. Saros. Biogeochemical patterns in lakes across southwestern Greenland. Harold W. Borns, Jr. Symposium, Climate Change Institute, University of Maine, Orono, ME (Oral)

B. Burpee\*, **R.M. Northington**, K. Simon, and J. Saros. Within-lake potential for microbial degradation of DOC in Arctic lakes of southwestern Greenland. 2015 ASLO Annual Aquatic Sciences Meeting, Grenada, Spain (Poster).

J. Saros\*, **R.M. Northington**, H. Malik, and N.J. Anderson. Linking experimental and paleolimnological approaches to decipher climate-induced changes in west Greenland lakes. 2015 ASLO Annual Aquatic Sciences Meeting, Grenada, Spain (Oral).

B. Burpee\*, **R.M. Northington**, K. Simon, and J. Saros. Bacterial degradation of dissolved organic carbon in Southwest Greenland Arctic Lakes. University of Maine Freshwater Symposium, Orono, ME (Poster)

**R.M. Northington\***, and J.E. Saros. Thermal patterns in lakes across southwestern Greenland. University of Maine Freshwater Symposium, Orono, ME (Poster)

J.E. Saros\*, H. Malik, and **R.M. Northington**. A Whole-Lake Mixing Experiment to Assess the Effects of Changing Thermal Structure in Arctic Lakes. University of Maine Freshwater Symposium, Orono, ME (Poster)

- 2014 **R.M. Northington\***, C.L. Osburn, N.J. Anderson, and J.E. Saros. Patterns and changes in dissolved organic carbon (DOC) across lakes in southwestern Greenland. American Geophysical Union Annual Meeting, San Francisco, CA (Oral)

B.T. Burpee\*, **R.M. Northington**, K.E. Simon, and J.E. Saros. Dissolved organic carbon degradation in response to nutrient amendments in southwestern Greenland lakes. American Geophysical Union Annual Meeting, San Francisco, CA (Poster)

J.E. Saros\*, **R.M. Northington**, H. Malik, and N.J. Anderson. Deciphering the ecology of key diatom taxa to understand climate-induced changes in west Greenland lakes over the Holocene. American Geophysical Union Annual Meeting, San Francisco, CA (Poster)

- R.M. Northington\***, H. Malik, and J.E. Saros. Multiple influences of climate change on Arctic lake ecosystems in southwestern Greenland. Joint Aquatic Sciences Meeting, Portland, OR (Poster)
- E.M. Hayes-Pontius\*, **R.M. Northington**, and J.E. Saros. Zooplankton community composition in Arctic lakes of southwest Greenland. Joint Aquatic Sciences Meeting, Portland, OR (Poster)
- B. Burpee\*, J.E. Saros, and **R.M. Northington**. What can bacterial enzyme activities tell us about nutrient limitation in southwest Greenland lakes? Harold W. Borns, Jr. Symposium, Climate Change Institute, University of Maine, Orono, ME (Oral)
- E.M. Hayes-Pontius\*, **R.M. Northington**, and J.E. Saros. Zooplankton community composition in Arctic lakes of southwest Greenland. Harold W. Borns, Jr. Symposium, Climate Change Institute, University of Maine, Orono, ME (Oral)
- Saros, J.E.\* , **R.M. Northington**, C. E. Williamson, and N. J. Anderson. A whole-lake mixing experiment to assess the effects of changing thermal structure in Arctic Lakes. Thermokarst Aquatic Ecosystems Workshop (THAW), Quebec City, Qc, Canada. (Poster)
- 2012 **Northington, R.M.\***, and J.R. Webster. Controls on leaf breakdown rates along inundation gradients in perennial Appalachian stream ecosystems. Long-term Ecological Research (LTER) All-Scientists Meeting, Estes Park, CO. (Poster)
- Baas, P., P. Barlow, M. Craig, S. Evans, **R.M. Northington**, and J. Sullivan (all co-presenters). Land Use: Unifying social and natural sciences in southern Appalachia and beyond. (Working group co-leader)
- Northington, R.M.\***, and J.R. Webster. Organic matter processing under an inundation gradient in perennial stream ecosystems. Society for Freshwater Science Annual Meeting, Louisville, KY. (Oral)
- 2011 **Northington, R.M.\***, and J.R. Webster. Organic matter breakdown in a perennial stream under experimentally reduced flow. North American Benthological Society (NABS) 59<sup>th</sup> Annual Meeting, Providence, RI (Poster)
- 2010 **Northington, R.M.\***, J.R. Webster, E.F. Benfield, D. Evans, S.H. Schoenholtz, A.J. Timpano, and C. Zipper. An assessment of ecosystem function in Virginia coalfield streams. North American Benthological Society (NABS) and American Society of Limnology and Oceanography (ASLO) Summer Meeting, Santa Fe, NM. (Poster)
- Hershey, A.E.\* , **R.M. Northington**, C.M. Luecke, and C.R. Johnson. Differential coupling of zoobenthos to pelagic productivity in arctic lakes: results from four years of whole-lake <sup>15</sup>N enrichment. North American Benthological Society (NABS) and American Society of Limnology and Oceanography (ASLO) Summer Meeting, Santa Fe, NM. (Oral)
- 2008 **Northington, R.M.\***, A. E. Hershey, S. C. Whalen, M. D. Keyse, and S. R. Beaty. Benthic secondary production in eight oligotrophic arctic lakes. North American Benthological Society (NABS) 56<sup>th</sup> Annual Meeting, Salt Lake City, UT. (Oral)
- Hershey, A.E.\* , **R.M. Northington**, M.C. Bostick, and S.C. Whalen. Carbon sources for methanogenesis and utilization of methane-derived carbon in sediments from an arctic lake: An experimental study using stable isotope tracers. North American Benthological Society (NABS) 56<sup>th</sup> Annual Meeting, Salt Lake City, UT. (Oral)
- 2007 **Northington, R.M.\***, E.C. Lynam, H.M. Rushforth, and A.E. Hershey. An analysis of recent restoration efforts on ecological function in piedmont NC urban streams. North American Benthological Society (NABS) 55<sup>th</sup> Annual Meeting, Columbia, SC. (Oral)

Hershey, A.E.\*, S. C. Whalen, W.J. O'Brien, M.D. Keyse, and **R.M. Northington**. <sup>15</sup>N enrichment and <sup>13</sup>C natural abundance studies of food sources for zoobenthos in 4 oligotrophic lakes. North American Benthological Society (NABS) 55<sup>th</sup> Annual Meeting, Columbia, SC. (Oral)

Hart-Smith, J.\*, D. Lofton, **R.M. Northington**, K. Fortino, S. Whalen, and A. Hershey. Methanogenesis and methane oxidation in Arctic lake sediments. North American Benthological Society (NABS) 55<sup>th</sup> Annual Meeting, Columbia, SC. (Oral)

2006 **Northington, R.M.\***, and A.E. Hershey. The effect of site type on the use of terrestrial and aquatic food resources by fish in headwater urban streams. North American Benthological Society (NABS) 54<sup>th</sup> Annual Meeting, Anchorage, AK. (Oral)

2005 **Northington, R.M.\***, and A.E. Hershey. An examination of the importance of terrestrial food sources in the diets of fishes in three piedmont North Carolina urban streams. North American Benthological Society (NABS) 53<sup>rd</sup> Annual Meeting, New Orleans, LA. (Oral)

**Northington, R.M.\***, and A.E. Hershey. An examination of the importance of terrestrial food sources in the diets of fishes in three piedmont North Carolina streams. North Carolina Water Resources Research Institute (WRRI) Annual Meeting, Raleigh, NC. (Poster)

2002 **Northington, R.M.\***, and T.W. Stewart. Use of Zebrafish (*Danio rerio*) as indicators of water quality in the Appomattox River, VA. Virginia Academy of Science Annual Meeting, Hampton, VA. (Oral)

2001 **Northington, R.M.\***, and T.W. Stewart. Use of Zebrafish (*Danio rerio*) as indicators of water quality in the Appomattox River, VA. Virginia Academy of Science Fall Undergraduate Research Meeting, Richmond, VA. (Poster)

**Northington, R.M.\***, and M. Carvan. Use of Zebrafish (*Danio rerio*) as indicators of water quality in Lake Michigan. NSF-REU Undergraduate Research Symposium, Great Lakes WATER Institute, Milwaukee, WI. (Poster)

**Northington, R.M.\***, and T.W. Stewart. Effect of substratum particle size on presence of benthic macroinvertebrates in the Appomattox River, VA. Virginia Academy of Science Annual Meeting, Harrisonburg, VA. (Oral)

### **Manuscript Reviewing**

Environmental Toxicology and Chemistry, Hydrobiologia, International Journal of Ecology, International Review of Hydrobiology, Journal of Environmental Quality, Limnology and Oceanography, Water Resources Research

### **Professional Memberships**

2014 to present American Geophysical Union (AGU)

2014 to present Association for the Sciences of Limnology and Oceanography (ASLO)

2004 to present Society for Freshwater Science (SWS; formerly North American Benthological Society, NABS)

### **Teaching**

#### **University of Maine:**

##### **• BIO 100 Beginning Biology Lecture**

- This course is the first in the two-semester sequence of introductory biology for majors. Class enrollment ranges from 750-850 students. This course is designed as a survey of biology covering ecology and evolution, biochemistry, cell biology, and genetics, and is offered to over 15 departments across campus (e.g. Biology and Ecology, Fisheries and Wildlife, Ocean Sciences, Psychology, etc.). I co-teach this class with the course

marine, Ocean Sciences, Psychology, etc.). I co-teach this class with the course coordinator (a geneticist) and a chemical ecologist using active learning techniques. We have developed a series of iClicker questions for each lecture that address basic content, while presenting them with new material for critical thinking and application. Students are continually assessed using our online learning platform, Synapse, in order for us to determine student progress and also help us tailor our lectures to any areas of confusion with the material. All instructors work with the laboratory coordinators to bridge lab and lecture topics and adjust course materials on a yearly basis in response to student performance.

- **BIO 100L      Beginning Biology Laboratory**
  - This laboratory is complementary to BIO 100 lecture, and is designed as an inquiry-based lab where student groups design and carry out their own projects. In addition to group work and basic skills of scientific investigation, students are asked to write mini-reports to summarize data and explain their experimental findings using primary literature. At the end of the semester, students are expected to create posters outlining one of their experiments, present it in a scientific meeting-style colloquium, and orally defend their project to their instructors.
- **BIO 222 Biology: The Living Science Lecture**
  - This course is designed for non-biology majors, with an enrollment ranging from 120 to 160, depending on need. The course was team taught with a chemical ecologist and paleoecologist, using active learning and hand-on activities. We use a combination of lecture and case-study based materials throughout the course, along with “current issues in biology” or discussions of controversial issues (e.g. diet pills, climate change, genetically-modified foods). We also utilized iClicker questions to generate discussion and assess student understanding of course content.
- **BIO 223 Biology: The Living Science Laboratory**
  - This course is complimentary, but not a required co-requisite for BIO 222. Students are asked to design their own experiments using inquiry-based techniques in addition to a basic introduction to statistics and graphing. Group work is a majority of the course, with a final project based on a current topic in biology that can relate to the students’ diverse backgrounds and career interests.
- **INT 500 Seminar in Quaternary Studies, “The Changing Arctic”**
  - This course is an interdisciplinary graduate-level seminar, with a focus on abrupt climate change in Arctic regions. Graduate students and invited speakers both represented different disciplines with a common interest in the Arctic, including anthropology, ecology, economics and policy, science communication, climatology, and glaciology. The course was a mixture of invited speakers, student-led discussions of primary literature and current events, and the development of NSF-style proposals for mock review panel discussions. Additionally, graduate students gained experience with peer-review, scientific outreach, and proper techniques of scientific criticism.

***Virginia Tech:***

- **BIOL 3114      Field and Lab Ecology**
  - Field and Lab Ecology provides students the opportunity to gain field experience, which is unavailable to them in General Ecology due to large class sizes. Small lab sections (<17 students) collect field data during almost 50% of the course meetings on topics including population dispersion/distribution, mark-recapture techniques, tree identification, and stream ecosystem measures. This course is both writing and field intensive, where students collect and process their own data, run statistics, create figures and tables, and create written reports on a variety of ecological questions. Two large field trips, one to the Eastern Shore of Virginia and the other to Great Smoky Mountain National Park, were undertaken to explore the ecology of diverse ecosystems and to collect data from each.
- **BIOL 4004      Freshwater Ecology Laboratory**
  - This laboratory is a co-requisite for Freshwater Ecology Lecture. During my time teaching the course, we examined a reservoir system (the Duck Pond), a series of streams, and carried out various ecological experiments in the field. Students were expected to create their own experimental designs, focused around stream and wetland in aquatic ecology. The



their own semester projects focused around themes and questions in aquatic ecology. The first part of the course was spent teaching students basic tools for collecting and analyzing aquatic samples, and the rest is open for the students to collect, process, and report on their own project data.

- **BIOL 5034 Ecosystem Dynamics (Lecture/Laboratory Assistant)**
  - My role in this course (as I was enrolled in the course as well) was to set up field experiments and train other students on techniques of collecting ecosystem-level data including estimates of production and respiration in streams, nutrient spiraling techniques, and litter breakdown rates.

#### **The University of North Carolina-Greensboro:**

- BIO 111L Introduction to Biology I Laboratory
- BIO 112L Introduction to Biology II Laboratory
- BIO 301 General Ecology (Lecture Assistant)

#### **Longwood University:**

- BIOL 113 Fundamentals of Zoology Laboratory Assistant

#### **Guest Teaching Lectures:**

- Ecosystem function in lentic, lotic, and man-made systems (Advanced Limnology, BIO 688, University of Maine)
- Nutrient Dynamics in Flowing Waters (River Ecology, BIO 463, University of Maine)
- Arctic Lake Ecology (Limnology, BIO 468, University of Maine)
- Aquatic Invertebrate Ecology, Thermal Structure of Lakes, Biogeochemistry (Freshwater Ecology Lecture, BIOL 4004, Virginia Tech)
- Methods in Stream Ecology (Stream Ecology, BIO 549, University of North Carolina-Greensboro)

#### **Student Mentoring**

\*\* more details of student mentoring activities are available upon request

#### **University of Maine**

Advisor: Laurel Sacco (University of Maine Undergraduate Honors Thesis)

Committee Member: Benjamin Burpee (M.S., Ecology and Environmental Science), Eric Veitch (University of Maine Undergraduate Honors Thesis)

#### **Virginia Polytechnic Institute and State University**

Mentored 7 undergraduate research assistants and 4 graduate students

#### **The University of North Carolina-Greensboro**

Mentored 5 undergraduate research assistants and 6 graduate students

#### **Service and Professional Development**

2016 Proposal Review Panel Member, U.S. National Science Foundation (NSF)

2015 Member, Automated Analysis of Constructed Response (AACR) working group, University of Maine.

*\*\*The AACR group is a multi-university collaboration funded by the National Science Foundation to assess student learning in STEM fields using written student responses as a way for instructors to determine their educational deficiencies and misunderstandings. The questions used by this group are written by STEM faculty and vetted prior to use in large lecture classes (e.g. BIO 100 and BIO 222), and represent a new way to assess learning separate from multiple choice questions.*

Ad-hoc reviewer, National Science Foundation-Arctic System Science

- 2014 Chair and Co-convenor, American Geophysical Union (AGU) Special Session, “Carbon in the Arctic: Influence of Climate Change in Aquatic and Terrestrial Ecosystems,” 2014 Annual Meeting, San Francisco, CA
- Fellowship Review Panel, Instars Diversity Program, Society for Freshwater Science
- 2012-2013 Committee Member, Biological Sciences Research Day Banquet Committee
- 2012-2013 Chairman, Virginia Tech Biology Graduate Student Association (BGSA) EEB Seminar Committee
- 2011- 2012 Graduate Student Representative, Coweeta Long-Term Ecological Research (LTER) Site
- 2010- 2012 Vice President, American Water Resources Association, Virginia Tech Student Chapter
- 2009-2013 Graduate Student Member, Virginia Tech Ecology, Evolution, and Behavior (EEB) Seminar Committee

### **Community Outreach**

- 2015 Judge, Maine State Science Fair, Bangor, ME
- 2014 Presenter “International Fieldwork in Greenland”, University of Maine CultureFest
- 2011 “Scientist” Volunteer. C2S2 Climate Change Student Summit. Virginia Bioinformatics Institute at Virginia Tech
- 2010 AWRA graduate student volunteer, Montgomery County Public Schools  
Secondary Science Teacher In-service
- Science Fair Judge, Gilbert Linkous Elementary School, Blacksburg, VA
- Science Fair Judge, Friends Meeting School, Ijamsville, MD
- 2009 Science Fair Judge, Gilbert Linkous Elementary School, Blacksburg, VA

### **Media Coverage**

- 09/15/2014 Fox 22/ABC 7 News Bangor, “U. Maine Studying Hemlock Die-off,” Jaclyn Cangro
- 08/18/2014 UMaine News, “Past, present hemlock declines focus of UMaine research project”
- 07/03/2014 Field Notes, Polar Field Services Newsletter, “Pics from the Field: SolarBee in southwestern Greenland”
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